

What is Claimed is:

1. A power supply system for outputting a voltage to a load by changing power sources, the power supply system comprising:

a DC-DC converter having a first switching element that transfers input voltage to the load, a second switching element that connects the load to a ground, and a control circuit that turns ON and OFF the first switching element and the second switching element with a first selection signal without overlapping ON-periods of the first switching element and the second switching element, wherein the second switching element turns ON  $m$  times in a stepping period during which the first switching element turns ON  $n$  times, wherein  $n$  is a predetermined integer, and  $m$  is an integer between any of zero and  $n$  that increases in the every stepping period; and

a series regulator that outputs a voltage to the load stepping-down the input voltage with a second selection signal.

2. A power supply system according to claim 1, wherein the control circuit receives step signals with gradually increasing pulse widths and gradually increases the number  $m$  of turn-ON of the second switching element in each of the stepping periods.

3. A power supply system according to claim 2, wherein the pulse width increases in the every stepping period by a specified increment step.

4. A power supply system according to claim 1, wherein the first selection signal is fed to the DC-DC converter and the second selection signal is fed to the series regulator corresponding to a loading condition of the load.

5. A power supply system according to claim 1, wherein the first selection signal and the second selection signal are mutually exclusive so that the first and second selection signals are not simultaneously fed to the control circuit.

6. A method of controlling a power supply system for outputting a voltage to a load by changing power sources, the power supply system a DC-DC converter having a first switching element that transfers input voltage to the load, a second switching element that connects the

load to a ground, and a control circuit that turns ON and OFF the first and second switching elements with a first selection signal, and a series regulator that outputs a voltage to the load with a second selection signal, the method comprising the steps of:

outputting a voltage to the load by inputting the first signal to the control circuit of the DC-DC converter to turn ON and OFF the first and second switching elements without overlapping ON-periods of the first and second switching elements, and turning ON the second switching element  $m$  times in a stepping period during which the first switching element turns ON  $n$  times, wherein  $n$  is a predetermined integer, and  $m$  is an integer between any of zero and  $n$  that increases in every stepping period; and

outputting a voltage to the load by inputting the second selection signal to the series regulator.